

# THE GOES-R HYDROLOGY ALGORITHM TEAM: PROGRESS AND PLANS

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## AWG Background and Structure

### GOES-R Background

- The next generation of National Oceanic and Atmospheric Administration (NOAA) Geostationary Operational Environmental Satellites (GOES) begins with the deployment of GOES-R in December 2014. Instruments include:
  - Advanced Baseline Imager (ABI), featuring:
    - Enhanced spectral capability: 16 bands in the visible and infrared (Figs. 1-2)
    - Enhanced spatial resolution: 0.5-km visible, 2-km infrared
    - Enhanced temporal resolution: full-disk scan in 5 min instead of 30
  - Geostationary Lightning Mapper (GLM)—continuous full-disk lightning imagery

### Algorithm Working Group (AWG) Purpose and Activities

- Develop, demonstrate, and recommend end-to-end capabilities for the GOES-R ground segment
- Provide sustained post-launch validation and product enhancements
- Specific activities include:
  - Proxy dataset development
  - Algorithm and application development
  - Product demonstration systems
  - Development of cal/val tools
  - Sustained product validation
  - Algorithm and application improvements

### Application Teams

- Support the AWG by providing recommended, demonstrated, and validated algorithms for processing GOES-R observations into user-required products which satisfy requirements.
- Each Application Team will:
  - Review candidate algorithms and identify algorithm deficiencies
  - Establish priorities and suggest solutions to resolve algorithm deficiencies;
  - Formulate, oversee, and participate in algorithm intercomparisons;
  - Recommend algorithms for GOES-R.
- The selected algorithms will then be demonstrated and documented for delivery to the System Prime via the GOES-R Program Office.

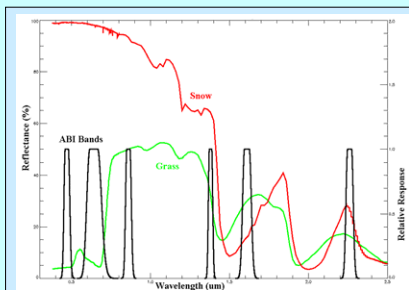


Figure 1. ABI visible and near-IR channels with different surface spectral responses overlaid in green (grass) and snow (red).

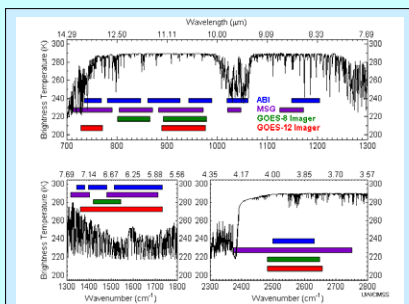


Figure 2. ABI IR channels compared to current GOES and MSG SEVIRI with standard atmospheric spectral response in black.

### Application Teams

Radiances	Land Surface
Soundings	Ocean Color
Imagery	Ocean SST
Winds	Cryosphere
Clouds	Radiation Budget
Aviation	Lightning
Aerosols / Air Quality / Atmospheric Chemistry	Space Environment
Hydrology	Simulation and Proxy Data Sets

### Hydrology Application Team Members

- Bob Kuligowski, NESDIS/STAR, Chair
- Phil Arkin, ESSIC
- Ralph Ferraro, NESDIS/STAR
- John Janowiak, NWS/CPC
- Andy Negri, NASA-GSFC
- Soroosh Sorooshian, UC-Irvine

## Algorithm Evaluation Strategy

### Environmental Data Records

- 3.4.6.1, "Probability of Rainfall"
- 3.4.6.2, "Rainfall Potential"
- 3.4.6.3, "Rainfall Rate / QPE"

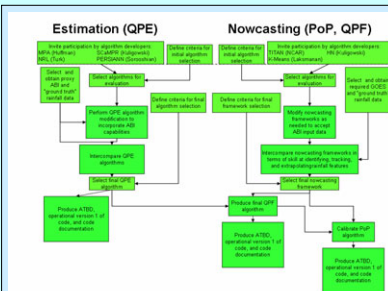
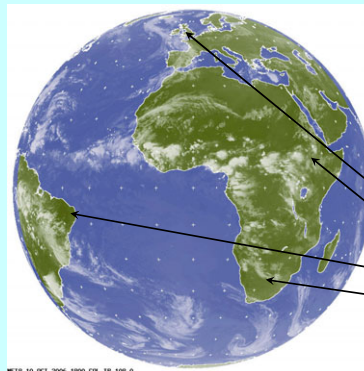


Figure 3. Flowchart of the Hydrology Algorithm Team algorithm evaluation and selection process.



### QPE Algorithms to Evaluate

- CPC IRFREQ (CPC—Janowiak / Joyce)
- NRL-Blended (Turk et al. )
- PERSIANN (Sorooshian et al. 2000)
- SCaMPR (Kuligowski 2002)

### Nowcasting Algorithms to Evaluate

- Hydro-Nowcaster (Scofield et al. 2002)
- K-Means (Lakshmanan et al. 2003)
- TITAN (Dixon and Weiner 1993)

### Algorithm Evaluation

- Provide ABI proxy and ground validation data to algorithm providers to adapt their algorithms for ABI capabilities
- Provide independent ABI proxy for evaluation—developers provide output QPE to Algorithm Team for evaluation and selection of recommended algorithm

### Proxy and Ground Validation Data

- METEOSAT Second Generation (MSG) Spinning Enhanced Visible and InfraRed Imager (SEVIRI) data will be used to create ABI proxy channels
- Ground validation data will be used for:
  - UK (NIMROD radar and MIDAS gauge data)
  - Ethiopia (daily gauge data)
  - Brazil (1-h, 3-h, and daily gauge data from CPTEC)
  - South Africa (daily ¼-degree gauge analysis)

### References

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